100:1 Metal Gearmotor 37Dx73L mm with 64 CPR Encoder

Pololu item #: 2826 **0** in stock

Price break	Unit price (US$)
1	39.95
10	35.96

Quantity: 1 Backorder
backorders *allowed*
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This gearmotor is a powerful 12V brushed DC motor with a **102.083:1** metal gearbox and an integrated quadrature encoder that provides a resolution of 64 counts per revolution of the motor shaft, which corresponds to **6533 counts per revolution** of the gearbox's output shaft. These units have a 0.61"-long, 6 mm-diameter D-shaped output shaft. This gearmotor is also available **without an encoder**.

Key specs at **12 V**: 100 RPM and 300 mA free-run, 220 oz-in (16 kg-cm) and 5 A stall.

Select options: 100 :1 Go ▶

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Description **Specs (13)** **Pictures (12)** **Resources (3)** **FAQs (2)** **On the blog (1)**

Overview

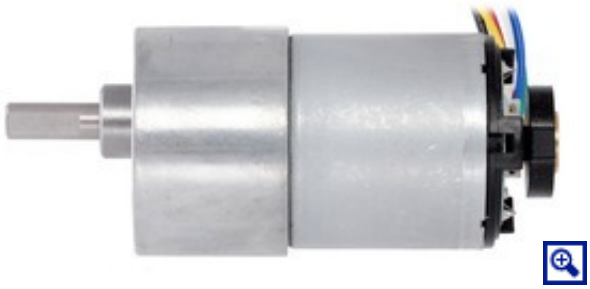
This powerful brushed DC gearmotor is available in six different gear ratios and features an integrated quadrature encoder with 64 counts per revolution (CPR) of the motor shaft. The **motor and encoder portion** is available by itself (no gearbox), and versions without the encoder are also available.

Gear Ratio	No-Load Speed @ 12 V	Stall Torque @ 12 V	Stall Current @ 12 V	 With Encoder	 Without Encoder
1:1	11,000 RPM	5 oz-in	5 A	**motor without gearbox**	
19:1	500 RPM	84 oz-in	5 A	**37Dx68L mm**	**37Dx52L mm**
30:1	350 RPM	110 oz-in	5 A	**37Dx68L mm**	**37Dx52L mm**
50:1	200 RPM	170 oz-in	5 A	**37Dx70L mm**	**37Dx54L mm**
70:1	150 RPM	200 oz-in	5 A	**37Dx70L mm**	**37Dx54L mm**
100:1	100 RPM	220 oz-in	5 A	**37Dx73L mm**	**37Dx57L mm**
131:1	80 RPM	250 oz-in	5 A	**37Dx73L mm**	**37Dx57L mm**

Note: Stalling or overloading gearmotors can greatly decrease their lifetimes and even result in immediate damage. Stalls can also result in rapid (potentially on the order of seconds) thermal damage to the motor windings and brushes; a general recommendation for brushed DC motor operation is 25% or less of the stall current.

These motors are intended for use at 12 V, though in general, these kinds of motors can run at voltages above and below the nominal voltage (they can begin rotating at voltages as low as 1 V). Lower voltages might not be practical, and higher voltages could start negatively affecting the life of the motor.

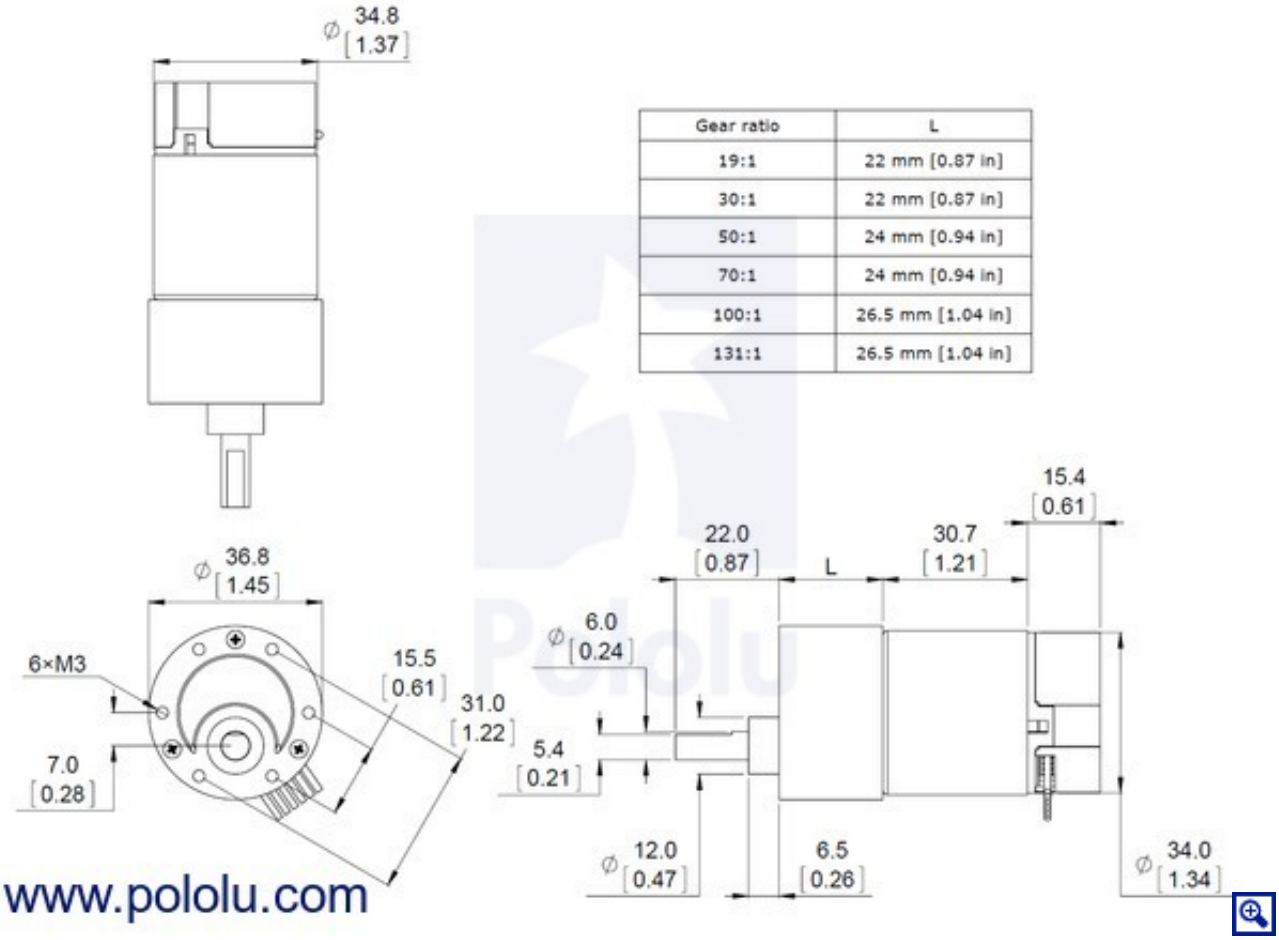
These gearmotors are functionally identical to the previous versions we carried **without end caps** (they use the same motor, encoder, and gearboxes). The black plastic end cap is easily removable if you need to access the encoder or want to slightly reduce the overall gearmotor size, but there is a little bit of base plastic that will remain, as shown in the pictures below:



Details for item #2826

Exact gear ratio: $\frac{25 \times 30 \times 28 \times 28 \times 30}{10 \times 10 \times 12 \times 12 \times 12} \approx \mathbf{102.083:1}$

Dimensions



Gear ratio	L
19:1	22 mm [0.87 in]
30:1	22 mm [0.87 in]
50:1	24 mm [0.94 in]
70:1	24 mm [0.94 in]
100:1	26.5 mm [1.04 in]
131:1	26.5 mm [1.04 in]

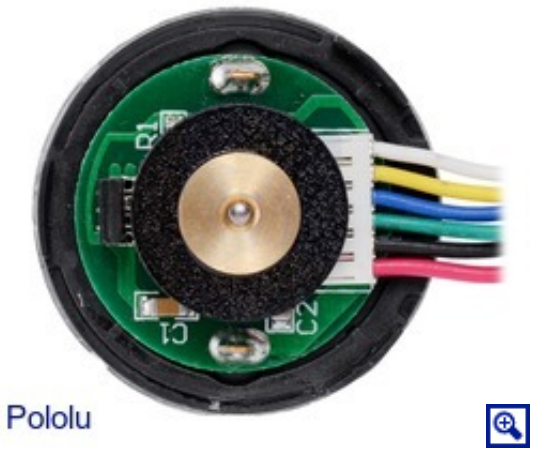
Dimensions of the 37D mm metal gearmotor with 64 CPR encoder. Units are mm over [inches].

This diagram is also available as a **downloadable PDF** (277k pdf).

Warning: Do not screw too far into the mounting holes as the screws can hit the gears. We recommend screwing no further than 3mm (1/8") into the screw hole.

Using the Encoder

A two-channel Hall effect encoder is used to sense the rotation of a magnetic disk on a rear protrusion of the motor shaft. The quadrature encoder provides a resolution of 64 counts per revolution of the motor shaft when counting both edges of both channels. To compute the counts per revolution of the gearbox output, multiply the gear ratio by 64. The motor/encoder has six color-coded, 11" (28 cm) leads terminated by a 1×6 female header with a 0.1″ pitch, as shown in the main product picture. This header works with standard **0.1″ male headers** and our male **jumper** and **precrimped wires**. If this header is not convenient for your application, you can pull the crimped wires out of the header or cut the header off. The following table describes the wire functions:



37D mm metal gearmotor with 64 CPR encoder (with end cap removed).

Color	Function
Red	motor power (connects to one motor terminal)
Black	motor power (connects to the other motor terminal)
Green	encoder GND
Blue	encoder Vcc (3.5 – 20 V)
Yellow	encoder A output

White	encoder B output

The Hall sensor requires an input voltage, Vcc, between 3.5 and 20 V and draws a maximum of 10 mA. The A and B outputs are square waves from 0 V to Vcc approximately 90° out of phase. The frequency of the transitions tells you the speed of the motor, and the order of the transitions tells you the direction. The following oscilloscope capture shows the A and B (yellow and white) encoder outputs using a motor voltage of 12 V and a Hall sensor Vcc of 5 V:

Encoder A and B outputs for 37D mm metal gearmotor with 64 CPR encoder (motor running at 12 V).

By counting both the rising and falling edges of both the A and B outputs, it is possible to get 64 counts per revolution of the motor shaft. Using just a single edge of one channel results in 16 counts per revolution of the motor shaft, so the frequency of the A output in the above oscilloscope capture is 16 times the motor rotation frequency.

Gearmotor accessories

The face plate has six mounting holes evenly spaced around the outer edge threaded for M3 screws. These mounting holes form a regular hexagon and the centers of neighboring holes are 15.5 mm apart. We carry two brackets for these gearmotors: a **stamped aluminum L-bracket** (sold in pairs) and a sturdier, tombstone-style **machined aluminum bracket** (sold individually):

Gearmotor with bracket and hub.

Pololu machined aluminum bracket for 37D mm metal gearmotors mounting a motor to a clear piece of acrylic.

The 6 mm diameter gearbox output shaft works with the **Pololu universal aluminum mounting hub for 6mm shafts**, which can be used to mount our larger **Pololu wheels** (80mm- and 90mm-diameter) or custom wheels and mechanisms to the gearmotor's output shaft as shown in the left picture below. Alternatively, you could use our **6mm scooter wheel adapter** to mount many common scooter, skateboard, and inline skate wheels to the gearmotor's output shaft as shown in the right picture below:

37D mm metal gearmotor with 64 CPR encoder connected to a Pololu 90×10mm wheel with a Pololu universal mounting hub.

A 37D mm gearmotor connected to a scooter wheel by the 6 mm scooter wheel adapter.

Finally, our **12mm hex wheel adapter for 6mm shaft** (also available in an **extended version**) lets you use these motors with many common hobby RC wheels, including **Dagu Wild Thumper Wheels**:

12mm Hex Wheel Adapter for 6mm Shaft connecting a Wild Thumper Wheel to a 37D mm Metal Gearmotor.

Selecting the Right Gearmotor

We offer a wide selection of metal gearmotors that offer different combinations of speed and torque. Our **metal gearmotor comparison table** can help you find the motor that best meets your project's requirements.

Some of the Pololu metal gearmotors.

People often buy this product together with:

Pololu Stamped Aluminum L-Bracket Pair for 37D mm Metal Gearmotors

Pololu Universal Aluminum Mounting Hub for 6mm Shaft, #4-40 Holes (2-Pack)

Pololu Aluminum Scooter Wheel Adapter for 6mm Shaft

Related products

Pololu Machined Aluminum Bracket for 37D mm Metal Gearmotors

Pololu Stamped Aluminum L-Bracket Pair for 37D mm Metal Gearmotors

Pololu Universal Aluminum Mounting Hub for 6mm Shaft, #4-40 Holes (2-Pack)

Pololu Universal Aluminum Mounting Hub for 6mm Shaft, M3 Holes (2-Pack)

Pololu Aluminum Scooter Wheel Adapter for 6mm Shaft

Pololu Wheel 80×10mm Pair - Black


Pololu Simple High-Power Motor Controller 18v15 (Fully Assembled)


Pololu Wheel 90×10mm Pair - White


Pololu Qik 2s12v10 Dual Serial Motor Controller


VNH5019 Motor Driver Carrier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Female Crimp Pins for 0.1" Housings 100-Pack


Orangutan SVP-1284 Robot Controller (assembled)


Male Crimp Pins for 0.1" Housings 100-Pack


0.100" (2.54 mm) Breakaway Male Header: 1×40-Pin, Straight, Black

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